

## Nagaraj Vinay Janthakahalli

Research Scientist  
Center for Bioelectronics and Biosensors  
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### EDUCATION

<b>PhD</b> University of Basel, Switzerland.	1999-2004
<b>Master of Science</b> University of Agricultural Sciences, Bangalore, India.	1996-1999
<b>Bachelor of Science</b> University of Agricultural Sciences, Bangalore, India.	1992-1996

### RESEARCH EXPERIENCE

<b>Research Scientist</b>	July 2010 to date
<b>Senior Biodesign Researcher</b>	February 2007 to date

*The Biodesign Institute at Arizona State University, Tempe, Arizona, U.S.A*  
Projects: Microarray-based analysis of cellular function by siRNA transfection, discovery of cancer therapeutics, novel biological applications of piezoelectric liquid dispensing technology for high throughput proteomics and glycomics and sensor platforms for detection of cells and biomarkers

<b>Postdoctoral Researcher</b>	July 2004 to January 2007
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*The Biodesign Institute at Arizona State University, Tempe, Arizona, U.S.A*  
Projects: 1. Discovery of early cancer glycan biomarkers and peptides that bind to or mimic these glycans, using a novel microarray based approach. 2. Functional characterization of putative *Arabidopsis thaliana* genes for Sialic Acid metabolism using Chinese Hamster Ovary cell lines and yeast as expression systems. 3. Bioinformatics of biochemical and signal transduction pathways.

<b>Doctoral thesis</b>	1999-2004
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*Botanical Institute of the University of Basel, Switzerland*  
Project: Molecular characterization of the fructan metabolism pathway in barley and wheat.  
Identification and characterization of key genes involved in the biosynthesis and breakdown of the plant fructose polymer, Fructans. Cloning of promoter regions of fructan metabolism genes and investigation of signal transduction events that regulate fructan metabolism.

<b>Masters thesis</b>	1996-1999
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*National Center for Biological Sciences, Bangalore, India.*  
Project: Gene expression profiling in rice seedlings subjected to abiotic stresses  
A comparative study of gene expression patterns in the seedlings of *Indica* Rice varieties IR-64 and RASI, during drought and salinity stress, was undertaken to investigate the differential regulation and role of stress responsive genes in tolerant/susceptible varieties.

## JOURNAL PUBLICATIONS

1. **Nagaraj VJ**, Eaton S, Wiktor P (2010). NanoProbeArrays for the Analysis of Ultra-low Volume Protein Samples Using Piezoelectric Liquid Dispensing Technology. *Journal of the Association for Lab Automation (manuscript accepted for publication, in press)*
2. **Nagaraj VJ**, Aithal S, Eaton S, Bothara M, Wiktor P, Prasad S (2010). NanoMonitor: Miniature Electronic Biosensor for Glycan Biomarker Detection. *Nanomedicine*: 5(3): 369-378(10).
3. Ritsema T, Brodmann D, Diks SH, Bos CL, **Nagaraj V**, Pieterse CMJ, Boller T, Wiemken A, Peppelenbosch MP (2009). Are small GTPases signal hubs in sugar-mediated induction of fructan biosynthesis. *PLoS One*. Aug 12;4(8): e6605.
4. Kilcoyne M, Shah M, Gerlach JQ, Bhavanandan VP, **Nagaraj VJ**, Smith AD, Fujiyama K, Sommer U, Costello CE, Olszewski N, Joshi L (2009) O-glycosylation of protein subpopulations in alcohol-extracted rice proteins. *Journal of Plant Physiology*. Feb 15;166(3):219-32.
5. **Nagaraj VJ**, Eaton S, Thirstrup D, Wiktor P (2008). Piezoelectric printing and probing of Lectin NanoProbeArrays for glycosylation analysis. *Biochem Biophys Res Commun*. 2008 Oct 31;375(4):526-30.
6. Martínez-Noël G, **Nagaraj VJ**, Calo G, Wiemken A, Pontis H (2007). Sucrose regulated expression of a Ca<sup>2+</sup>-dependent protein kinase (TaCDPK1) gene in excised leaves of wheat. *Plant Physiology and Biochemistry* 45(6-7):410-419.
7. Nagesha N, Gowda PHR, Madhusudana SN, Joshi L, **Nagaraj VJ**, Kilcoyne M, Devaiah BN, Madhuvanthi R, Vanikulkarni, Saraswathi S, Dinesh A,N, Gowda TKS, Mehamedooda K (2007). Genetic transformation of cantaloupe melon (*Cucumis melo L.*) with the rabies virus glycoprotein gene (PRGSpRgp) and immunization studies in mice. *The Journal of Horticultural Science and Biotechnology* 82(3):383-386.
8. Martínez-Noël G, Togneti J, **Nagaraj VJ**, Wiemken A, Pontis H (2006). Calcium is essential for fructan synthesis induction mediated by sucrose in wheat. *Planta* 225(1):183-91.
9. Van Riet L, **Nagaraj VJ**, Clerens S, Van den Ende W, Wiemken A, Van Laere A (2006). Purification, cloning and functional characterization of a fructan 6-exohydrolase (6-FEH) from wheat (*Triticum aestivum L.*). *Journal of Experimental Botany* 57(1):213-223.
10. **Nagaraj VJ**, Galati V, Lüscher M, Boller T, Wiemken A (2005). Cloning and functional characterization of a cDNA encoding barley soluble acid invertase (HvINV1). *Plant Science* 168: 249-258.
11. Tran N, Baral C, **Nagaraj VJ** and Joshi L (2005). Knowledge-Based Framework for Hypothesis Formation in Biochemical Networks. *Bioinformatics*. 2005 Sep 1;21 Suppl 2:ii213-ii219.
12. Elfstrand M, Feddermann N, Ineichen K, **Nagaraj VJ**, Wiemken A, Boller T, Salzer P (2005). Ectopic expression of the arbuscule-specific gene Mtchit 3-3 stimulates germination of glomalean fungi. *New Phytologist* 167 (2), 557-570.
13. Tran N, Baral C, **Nagaraj VJ** and Joshi L (2005). Knowledge-Based Integrative Framework for Hypothesis Formation in Biochemical Networks. *Lecture Notes in Computer Science* 3615: 121-136.
14. **Nagaraj VJ**, Altenbach D, Galati V, Lüscher M, Meyer AD, Boller T, Wiemken A (2004). Distinct regulation of sucrose:sucrose-1-fructosyltransferase (1-SST) and sucrose:fructan-6-fructosyltransferase (6-SFT), the key enzymes of fructan synthesis in barley leaves: 1-SST as the pacemaker. *New Phytologist* 161(3): 735-748.
15. **Nagaraj VJ**, Riedl R, Boller T, Wiemken A, Meyer AD (2001) Light and sugar regulation of the barley sucrose:fructan 6- fructosyltransferase promoter. *Journal of Plant Physiology* 158: 1601-1607.

## NEUCLOTIDE SEQUENCE PUBLICATIONS IN EMBL/GENBANK/DBJ DATABASES

1. AJ306962: *Hordeum vulgare* sucrose:fructan 6-fructosyltransferase gene promoter
2. AJ585414: *Festuca arundinacea* sucrose:sucrose 1-fructosyltransferase gene promoter
3. AJ605333: *Hordeum vulgare* mRNA for fructan 1-exohydrolase precursor gene
4. AM075205: *Triticum aestivum* mRNA for fructan 6-exohydrolase (6-FEH)
5. AJ567377: *Hordeum vulgare* mRNA for sucrose:sucrose 1-fructosyltransferase
6. AJ605333: *Hordeum vulgare* mRNA for soluble acid invertase (HvSAI)
7. AJ621356: *Triticum aestivum* mRNA for putative calcium-dependent protein kinase
8. AY238969: *Medicago truncatula* chitinase (chitIII-3) gene, complete cDNA
9. AY238970: *Medicago truncatula* chitinase (chitIII-4) gene, complete cDNA
10. AY294484: *Medicago truncatula* chitinase (chitIII-1) gene, complete cDNA

## CONFERENCE ABSTRACT PUBLICATIONS

1. MRS 2009: Annual Meeting of the Materials Research Society, Boston, Massachusetts, USA (November-December 2009). Enhanced Electrochemical Detection of Protein Glycosylation using Biogenic Silica Based Nanopores. Aithal S, Chatterjee S, Lin K, Ramakrishna B L, **Nagaraj VJ**, Wiktor P and Prasad S. *Proceedings of the Materials Research Society 2009 Fall Meeting, Volumes 1194-1241*.
2. MRS 2009: Annual Meeting of the Materials Research Society, Boston, Massachusetts, USA (November-December 2009). Bothara M, Nagaraj VJ, Eaton S, Aithal S, Chatterjee G, Wiktor P, and Prasad S. Nanomonitor technology for Glycosylation Analysis. *Proceedings of the Materials Research Society 2009 Fall Meeting, Volumes 1194-1241*.
3. AAAS PD 2009: Annual Meeting of The American Association for the Advancement of Science, Pacific Division, San Francisco, California, USA (August 2009). Chatterjee G, Nagaraj VJ, Wiktor P, Eaton S and Prasad S. Nanomonitor Technology for Glycosylation Analysis. *Proceedings of the Pacific Division, AAAS 28(1):64 [abstract #36]*.
4. Glycobiology 2008: Annual Conference of the Society for Glycobiology, Fort Worth, Texas, USA (November 2008). **Nagaraj VJ**, Eaton S, Thirstrup D, Wiktor P. Glycosylation Analysis by Piezoelectric Printing and Probing of Lectin NanoProbeArrays. *Glycobiology 18 (11): 941-942. (Invited speaker at this conference)*
5. AACR 2008: Annual Meeting of the American Association for Cancer Research, San Diego, California, USA (April 2008). Agrawal P, Gu J, Hurth C, Yang J, **Nagaraj VJ**, Zenhausern F and Berens M. Imprinting Soft Biological Gels Below One Micron Feature Size for 3-D Cell Culture and Microenvironment. *Published Online at the Proceedings of the American Association for Cancer Research 2008*.
6. AAAS 2007: Annual Meeting of The American Association for the Advancement of Science, St. Louis, Missouri, USA (Feb 2007). Riblett A, Chow K, **Nagaraj VJ**, Shah M, Joshi L. Cell capture using CLIO nanoparticles conjugated to glycan binding peptides. *AAAS 2007 Book of Abstracts: A330*.
7. Glycobiology 2006: Annual Conference of the Society for Glycobiology, Los Angeles, California, USA (Nov 2006). Boltz K, **Nagaraj VJ**, Svarovsky S, Lake D, Stafford P, Joshi L. High Throughput Technology for the Identification and Characterization of Glycan Binding Peptides. *Glycobiology (November 2006 issue): 1155-1156*.
8. AAAS 2006: Annual Meeting of The American Association for the Advancement of Science, St. Louis, Missouri, USA (Feb 2006). Chow K, **Nagaraj VJ**, Shah M Joshi L. Localization of Arabidopsis thaliana sialyltransferases heterologously expressed in CHO cells. *AAAS 2006 Book of Abstracts: A162*.
9. ECCB 2005: The 4th European Conference on Computational Biology, Madrid, Spain (Sept 2005). Tran N, Baral C, **Nagaraj VJ**, Joshi L. Knowledge-based framework for hypothesis formation in biochemical networks. *ECCB/JBI 2005: 219*

10. DILS 2005: The 2nd International Workshop on Data Integration in the Life Sciences, San Diego, USA, (July 2005). Tran N, Baral C, **Nagaraj VJ**, Joshi L. Knowledge-based integrative framework for hypothesis formation in biochemical networks. *DILS 2005: 121-136*
11. Glycobiology 2004: Annual Conference of the Society for Glycobiology, Honolulu, Hawaii, USA (Nov 2004). Joshi L, Shah M, Daskalova S, **Nagaraj VJ**, Prasanna C, Gerlach J, Smith AG. Plant Sialobiology. *Glycobiology 14 (11): 1060-1060*.
12. Fructan 2004: Fifth International Fructan Symposium Havana, Cuba (Dec 2004). Ritsema T, Tuynman J, Diks S, Bos C, Brodmann D, **Nagaraj VJ**, Peppelenbosch M, Boller T, Wiemken A. The promoter of sucrose:fructan 6-fructosyl-transferase (SFT) and its regulation by sucrose. *Fructan 2004 Book of Abstracts: 69*.
13. GRC 2002: Gordon Research Conference on CO<sub>2</sub> Fixation and Metabolism in Green Plants, Massachusetts, USA (Aug 2002). **Nagaraj VJ**, Wiemken A. *Regulation of Fructan Metabolism in Barley Leaves*.
14. Fructan 2000: Fourth International Fructan Symposium, Arolla, Switzerland (Aug 2000). **Nagaraj VJ**, Wiemken A, Meyer AD. Identification and Characterization of the Barley 6-SFT Gene Promoter. *Fructan 2000 Book of Abstracts: 14. (Invited speaker at this conference)*
15. NRBN 1999: Seventh National Rice Biotechnology Network Meeting, Bangalore, India (October 1999). **Nagaraj V J** and Morawala-Patell V (1999) A comparative study of the gene expression at the mRNA level during abiotic stress in the seedlings of Indica Rice varieties IR-64 and RASI using heterologous cDNA probes. *NRBN '99 Book of Abstracts*.

#### PROFESSIONAL ACTIVITIES

1. Peer-reviewer for grant proposal and research articles submitted to journals
2. Member of the scientific research society 'Sigma Xi' and the 'Society for Glycobiology'
3. Scientific consultant for the company 'iNanoBio LLC' for the DNA sequencing innovations
4. Scientific consultant for the company 'Dhal Natural LLC' for development of biosensors
5. Secretary, Biodesign Association of Postdocs (2006)
6. Judge: High School Science Fair, Tempe, Arizona, USA
7. Invited Guest lectures at various research US & International institutes and universities

#### TEACHING EXPERIENCE

1. Spring 2010, MIC 495 (Undergraduate Research) at Arizona State University
2. Fall 2007, Fall 2008, Spring 2009 and Fall 2009; MBB 484 (On-Campus Internship) at Arizona State University
3. Spring 2010, guest lecturer for ABS 311 (Applied Cellular Biology) at ASU
4. Spring 2010, guest lecturer for ABS 490 (Applied Biological Sciences Seminar) at ASU
5. Instructor for Advanced Cellular and Molecular Biology (BME598, fall 2005) course at Arizona State University.
6. Invited guest lecturer at several classes at Arizona State University from 2004 onwards
7. Instructor for Intensive Block Course in Plant Molecular Biology for Masters Degree students at the University of Basel, Switzerland, summer 2002 & 2003
8. Lectures at 'Research Seminar in Plant Biology' course for Masters Degree students at the University of Basel, Switzerland. winter 2001-2003
9. Instructor 'Research project in Plant Science' for undergraduates majoring in plant science at the University of Basel, Switzerland. winter 2000-2004
10. Instructor for "Practical Course in Plant Physiology and Molecular Biology" from October 1999 to 2004 at the University of Basel
11. Teaching Assistant at the Department of Biotechnology, University of Agricultural Sciences, Bangalore, 1997-98

## MENTORING ACTIVITIES

1. Seron Eaton: Master's thesis supervisor, fall 2007 to spring 2010
2. Lubna Ahmad: PhD student, 2007 to 2009
3. Jamison Rupnik: undergraduate student, spring 2009 onwards
4. Erica Arroyo: January to July 2010
5. Ian Blong: SOULR scholar & undergraduate researcher, 2007 to March 2010
6. Andrew Koons: undergraduate student, 2007 to date
7. Karen Chow: undergraduate Honor's Thesis Supervisor 2006-2007
8. Amber Ribblet: undergraduate Honor's Thesis Supervisor 2006-2007
9. Dishant Karla: undergraduate student 2006-2007
10. Virginie Galati: Technician 2002-2004
11. Ralph Riedl: Diploma Thesis 2000-2002
12. Harini Manikandan: high school intern, summer 2009
13. Ashok Kumar: high school intern, summer 2008

## WORKSHOPS PARTICIPATIONS

1. SOULR (School of Life Sciences Undergraduate Research) Program Workshop for Mentors, Arizona State University, Tempe, Arizona, USA
2. Molecular genetics of the moss, *Physcomitrella patens*: Practical Workshop. University of Leeds, England.
3. Survival Skills in the Era of Genome Sequencing. Swiss Institute of Bioinformatics, Lausanne, Switzerland.

## TECHNICAL SKILLS

- ❖ Extensive use of yeast systems (both *Saccharomyces cerevisiae* and *Pichia pastoris*) to express proteins and characterize newly cloned cDNAs
- ❖ Mammalian cell culture, transfection and gene expression analysis. Use of Chinese Hamster Ovary (CHO) cells as a protein expression system.
- ❖ Cancer research techniques including cancer cell culture, flow cytometry, fluorescence microscopy, high-throughput siRNA screens of genes etc.
- ❖ Microarray fabrication and analysis for gene expression, proteomics and glycomics
- ❖ Glycosylation analysis: HPLC, lectin microarray, glycosensors and other analytical techniques for simple and complex sugars
- ❖ Plant tissue culture, use of the gene gun (BIORAD PDS-1000/He) and *Agrobacterium* for plant transformation, and analysis of transgenic plants
- ❖ Development of sensors for biomarker identification
- ❖ Bioinformatics: Sequence analysis, signaling and metabolic pathway bioinformatics
- ❖ Expertise in a broad range of molecular biology, biochemistry and cell biology techniques
- ❖ Gene expression analysis using Real-time (quantitative) PCR
- ❖ Gene promoter cloning and promoter activity analysis